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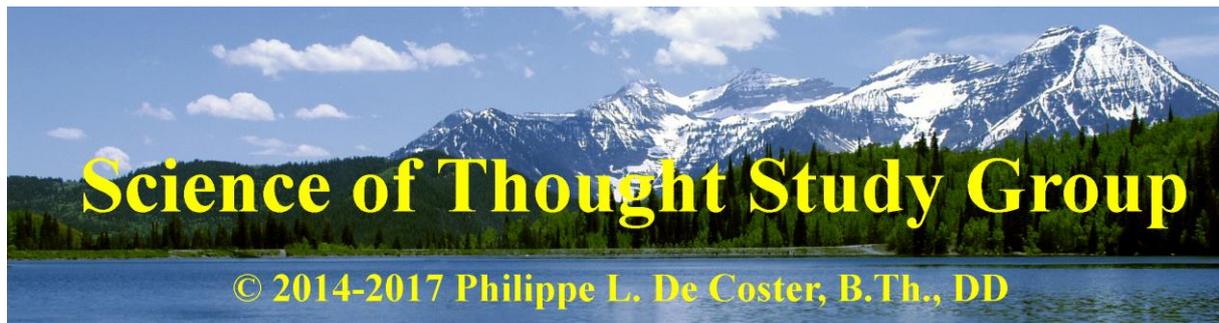


**Your brain on God:
How religion activates the
same response as love and drugs**

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Your Brain on God:

How religion activates the same response as love and drugs

The study authors say that the link between reward and decision-making could aid research into religious extremism.

The reward centres of the brain light up in an fMRI scanner when devout Mormons report having religious experiences, researchers say. The study authors claim that understanding how religion and reward are interconnected could aid research into religious radicalisation.

The researchers studied nineteen Mormons who were all former missionaries. They set out to see how the brains of these study participants responded when they were having a religious experience commonly described as "feeling the Spirit".

The participants were shown images, recordings and religious quotes from Mormon spiritual leaders and texts. They were asked to rate their spiritual feelings in response to each of them, while their brains were being scanned.

Love and drugs

Brain regions that the researchers said were associated with having religious experiences included the nucleus accumbens, which is involved in romantic love, appreciation of music, cocaine and methamphetamines.

"We're just beginning to understand how the brain participates in experiences that believers interpret as spiritual, divine or transcendent," says paper author Jeff Anderson of the University of Utah. "In the last few years, brain imaging technologies have matured in ways that are letting us approach questions that have been around for millennia."

"Religious experience is perhaps the most influential part of how people make decisions that affect all of us, for good and for ill. Understanding what happens in the brain to contribute to those decisions is really important," says Anderson.

He questions whether the same neural circuitry could be involved in radicalisation and extremism.

"Maladaptive religious experiences can be shaped by the same stimuli," says Anderson. He argues that it is a "compelling hypothesis" that the same neural networks are involved in acts of religious extremism such as an Isis member contemplating religious violence.

Complex drivers

Katja Wiech, a neuroscientist at the University of Oxford, points out that religious belief is an extremely complex topic to study. She says that it's too soon to draw conclusions about the connection to reward and extremism based on this study.

"The topic of this study is a very complex experience. If you would ask somebody what's involved in a religious experience, it's a mixed bag of lots of different things," Wiech says.

"What we see in the brain when you put people in a scanner when they're experiencing this part of the religion, is that it's not something that is specific – these are regions of the brain that are involved in lots of different functions. None of them is the 'God spot'."

Altered state

Wiech says that understanding the individual motivations and drivers of extremist behaviour is likely to be more promising than studying connections to the reward centres in the brain that light up in such studies.

"When you look at extremism, it could be motivated by so many different factors. If you take somebody in a terror attack – their motivation to do it might not have anything to do with the rewarding aspect."

However, Wiech agrees that these kinds of studies are necessary in order to consider building scientific understanding of religious radicalisation.

"When you have religious experiences you can enter an altered state of consciousness. People really change the way they behave. So understanding the neurobiology behind [extremism] could tell us something about how people are willing to go so far."

Is the human brain hardwired for God and religion?

Our Lady of Lourdes appears eighteen times to a miller's daughter collecting firewood in a small market town in France. A young woman Joan of Arc leads an army through critical strategic victories in the Hundred Years' War, claiming to be guided by divine insight. In the very first hours of the twentieth century,

a student asks God to fill her with the holy spirit and begins to speak in tongues, and the Pentecostal Church was created.

Are these incidents case studies in undiagnosed mental illness, spiritual transcendence, or something nebulously in between?

It's an interesting and elusive question for neuroscientists, with big implications on our understanding of consciousness. As the Nobel-prize winning neuropsychiatrist Eric Kandel has said, reductionism -- the idea that a system is nothing more than the interactions between its parts -- is an extremely successful theory of biology, but as a "theory of everything," it fails to provide us with a sufficient explanation of a few basic, fundamental elements that shape human perception.

Particularly, religion. Why do we care whether or not God exists? And why do so many people believe? A new generation of neuroscientists is addressing those questions directly, with the ambitious goal of measuring what happens to the human brain during spiritual experiences. Dr. Andrew Newberg is the Director of Research at the Myrna Brind Center for Integrative Medicine and a pioneer in the field of neurotheology. Newberg doesn't identify with a particular religious group, but he's fascinated by the profound significance and persistence of human faith throughout history.

To measure the effects of trance states and ritual on the brain, he uses a technique called single photon emission computed tomography, in which subjects are injected with a chemical that emits gamma rays. A computer collects the information transmitted by the rays and constructs from it an image of the brain depicting blood flow to the various regions. The more blood flow to a particular region, the more brain activity. Using this method, Newberg has studied the brains of Franciscan nuns during prayer, Tibetan monks during meditation, and Pentecostals speaking in tongues.

What's the Significance?

What he's found is surprising: religious feeling is not invisible. The common thread among mystical and spiritual practices is that while people are engaged in them, the lobes of their brain can be seen working together to create a powerful emotional experience. "When we looked at [subjects'] brain scans, instead of the frontal lobes going up, the frontal lobes actually went down [in blood flow]. Which makes sense in the context of what they are describing is happening to them," Newberg explains. "They don't feel that they're purposely making it [happen]. They feel that they are being basically overcome by the experience."

He believes that what subjects describe as their interaction with God is a shutting down of their concentrative, wilful attention in order to allow this

experience of transcendence to happen. "For them it's the spirit of God which is moving through them. I can't prove that or disprove that on the basis of a brain scan, but I can see the changes that are going on in the brain while they're engaged in this very, very powerful and very deep spiritual practice... It certainly looks like the way the brain is put together makes it very easy for human beings to have religious and spiritual experiences."

The question, then, is not whether we're wired for what we've come to call spiritual experiences exist, but how a tendency towards the transcendent makes us better adapted to live and survive in the world around us. What is the evolutionary purpose of belief?

A hint lies in the fact that it's likely the repetition rather than the content of a ritual that makes it effective. It doesn't seem to matter whether a person chants or recites a verse or thinks a specific thought; a transcendent or meditative state is achieved through practice, strengthening connections in the brain around a particular idea or task. Religious practices may in fact be useful in a secular context. Whatever they mean to you, there's evidence that simple rituals like breathing deeply when you're stressed can improve your mental health and help you cope with the world, even if you're sceptical about whether there's a divine plan behind it.

The God-Spot in the Brain – Is it religious hardwired?

The question of whether religion has been “hardwired” into our brains or an evolutionary adaptation has been debated for decades, however, more recently we have uncovered scientific underpinning for both possibilities.

It should first be noted that our brains process all of our experiences whether actual (reading this article right now) or imagined (your dreams tonight). Your reality is just that... *your* reality, and not that of your neighbours.

There are innate programs that are run by our brain's CPU such as breathing, heart rate control, and sneezing. Complex tasks such as tying our shoes are generally run by multiple brain processes spanning visual perception to motor skills. Is the religious experience just another brain program?

Barrett equates religion to language acquisition where “we come into this world cognitively prepared for language; our culture and upbringing merely dictate which languages we will be exposed to.” Brain Blogger's own Dr. Jennifer Gibson discussed how “the brain seems predisposed to a belief in all things spiritual” back in 2008.

Scientists have approached the question of the neurobiological underpinnings of the spiritual or religious experience in largely five different ways:

First, a variety of brain imaging and monitoring techniques such as EEG, MRI including functional MRI (fMRI), PET, and SPECT have compared data on brain activity and blood flow in specific spiritual practices. Some studies have identified specific brain areas that are consistently active (or suppressed) during the religious practice.

Second, capitalizing on the religious/spiritual experience seen with hallucinogenic agents, LSD, ecstasy, and other drugs which act on the serotonergic system have been used to study metabolic changes.

Third, patients with neurological and psychiatric diseases such as temporal lobe epilepsy and schizophrenia are used as a prime population of spiritual experiences or alterations in religious beliefs.

Fourth, studies are done with prayer and meditation for a host of physical and mental health conditions such as anxiety and hypertension.

Fifth, psychologists and anthropologists deemed that children left to their own devices would have some conception of God. Some attribute this to our innate sense of detecting patterns in the world (as to discern predators or prey in nature), while other propagate the notion of a “super sense” — or a cognitive tendency to infer hidden forces in the world working for good or ill.

As the original question remains unanswered, we are early... the neuroscientific study of religious and spiritual phenomena remains in its infancy. There is mounting evidence of a biological correlate to these phenomena, however, this does not necessarily negate an actual spiritual component.

Keeping thinking, and let no religion interfere in your way of thinking. Cultivate sound thinking and enjoy life you live only once. There is no afterlife.

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